CLAIMS

WHAT IS CLAIMED IS:

1. A method for managing risk in a market related to a commodity delivered over a network, comprising the steps of:

modeling locational prices of the commodity in the market as a linear combination of congestion prices for congestible lines in the network; and

producing a combination of price risk instruments for the market in a proportion such that an effect of the congestion prices for the congestible lines on the locational prices of the commodity is reduced.

2. The method according to claim 1, wherein the step of producing the combination of price risk instruments includes producing the combination in a proportion such that the effect of the congestion prices for the congestible lines on the locational prices of the commodity is eliminated.

3. The method according to claim 2, wherein the step of producing the combination includes selecting a portfolio **y** of price risk instruments, such that:

$$\mathbf{z'A - y'P'A = 0},$$

where **A** represents distribution factors describing the physics of power flows in the network, **P** represents the available market of price instruments, and **z** represents a market participant's underlying position in the market at a prospective time T.

4. A portfolio derived by the method according to claim 3.

5. A method for evaluating a portfolio of price risk instruments in a market related to a commodity delivered over a network, comprising the steps of:

estimating a plurality of distribution factors indicating effects on one or more congestible lines in the network due to transfers of the commodity at respective locations in the network; and

evaluating the portfolio based on the estimated distribution factors.

6. The method of claim 5, wherein the step of evaluating the portfolio includes the step of calculating a cost f based on the formula $f = (\mathbf{z'A} - \mathbf{y'P'A})\lambda + \mathbf{y'F}$, wherein:

y represents the portfolio of price risk instruments;

z represents underlying positions in the market at the prospective time;

P represents a market of available price risk instruments;

F represents prices for the available price risk instruments;

A represents the distribution factors; and

λ represents prices of congestion for the congestible lines;

7. A method for hedging a set of underlying positions at a prospective time in a market related to a commodity delivered over a network, comprising the steps of:

estimating a plurality of distribution factors indicating effects on one or more congestible lines in the network due to transfers of the commodity at respective locations in the network; and

producing portfolio of price risk instruments for the market based on the estimated distribution factors.

8. The method for hedging according to claim 7, wherein the step of producing the portfolio includes the step of eliminating an effect of congestion prices for congestible lines on prices of the commodity at respective locations in the network.

9. The method according to claim 7, wherein the step of producing the portfolio includes selecting a portfolio **y** of price risk instruments, such that $\mathbf{z'A - y'P'A = 0}$, where **A** represents the distribution factors, **P** represents the available market of price instruments, and **z** represents the underlying position.

10. A portfolio derived by the method according to claim 9.

11. A method for identifying arbitrage opportunities among a plurality of available price risk instruments in a market related to a commodity delivered over a network, comprising the step of:

estimating a plurality of distribution factors indicating effects on one or more congestible lines in the network due to transfers of the commodity at respective locations in the network; and

producing a portfolio of price risk instruments from among the available price risk instruments based on the estimated distribution factors, wherein a number of the price risk instruments is greater than a number of the one or more congestible lines.

12. The method according to claim 11, wherein the step of producing the portfolio includes selecting a portfolio **y** of price risk instruments, such that $\mathbf{y'P'A = 0}$, where **A** represents the distribution factors, and **P** represents the available market of price instruments.

13. A portfolio derived by the method according to claim 12.

14. A method of identifying arbitrage opportunities among a plurality of available price risk instruments in a market related to a commodity delivered over a network, comprising the step of:

modeling locational prices of the commodity in the market as a linear combination of congestion prices for congestible lines in the network; and

producing a portfolio of price risk instruments from among the available price risk instruments in a proportion such that an effect of the congestion prices for the congestible lines on the locational prices of the commodity is eliminated, wherein a number of the price risk instruments is greater than a number of the one or more congestible lines.

15. The method according to claim 14, wherein the step of producing the portfolio includes selecting a portfolio **y** of price risk instruments, such that $\mathbf{y'P'A} = 0$, where **A** represents the linear combination, and **P** represents the available market of price instruments.

16. A portfolio derived by the method according to claim 15.

17. A computer-readable medium bearing instructions for managing risk in a market related to a commodity delivered over a network, said instructions being arranged to cause one or more processors upon execution thereby to perform the steps of:

modeling locational prices of the commodity in the market as a linear combination of congestion prices for congestible lines in the network; and

producing a combination of price risk instruments for the market in a proportion such that an effect of the congestion prices for the congestible lines on the locational prices of the commodity is reduced.

18. A computer-readable medium bearing instructions for evaluating a portfolio of price risk instruments in a market related to a commodity delivered over a network, said instructions being arranged to cause one or more processors upon execution thereby to perform the steps of:

estimating a plurality of distribution factors indicating effects on one or more congestible lines in the network due to transfers of the commodity at respective locations in the network; and

evaluating the portfolio based on the estimated distribution factors.

19. A portfolio comprising: a plurality of price risk instruments for a market related to a commodity delivered over a network,

wherein the price risk instruments **y** are proportioned such that $\mathbf{z'A - y'P'A = 0}$,

A represents distribution factors describing the physics of power flows in the network,

P represents the available market of price instruments, and

z represents a market participant's underlying position in the market at a prospective time T.

20. The portfolio of claim 19, wherein a number of the price risk instruments is greater than a number of the at least some congestible lines.